

An evaluation of the use of a Website and Telephonic Information Service as public education about forgetfulness

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Original Research

An Evaluation of the Use of a Website and Telephonic Information Service as Public Education about Forgetfulness

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ABSTRACT

There is increasing interest in telehealth as a potential new approach for healthcare delivery. To investigate whether telehealth is suitable to inform the older population about forgetfulness, we designed and compared two types of telehealth: Memory Website and the Memory Phone. The aim of this study was to analyze characteristics of the individuals who are interested in the Memory Phone and the Memory Website, to investigate the nature of the information in which the users were interested, and to evaluate the usefulness of the services. Participants were asked to answer several questions before and after visiting the main information menu of the telehealth facilities. Characteristics are given for all participants who used the facilities. In the evaluation period of 3 months, more individuals used the Memory Website ($n = 2,631$) than the Memory Phone ($n = 228$). The two services were used by different populations. Phone users were significantly older, more often female, and perceived themselves more often as forgetful. In the specific group of nonprofessional older individuals, general information about memory was more requested by Phone users compared with Website users (67% vs. 41%). Website users more often requested strategies and tips than Phone users (66% vs. 34%). The Phone and the Website were both considered useful. Overall, the Memory Website and the Memory Phone are two different types of evidence-based telehealth interventions, which are relevant for different populations, and are useful in informing the older population about forgetfulness and aging.

INTRODUCTION

IN RECENT YEARS, there has been increasing interest in e-health and telehealth as an approach for healthcare delivery.¹ Telehealth refers to public health services and health prevention delivered via electronic communications. Especially people who are not necessarily unhealthy, but who wish to remain well and

independent might benefit from telehealth.² It can be expected that the use of telehealth will form an integral part of everyday lives in the future, especially of older people, because many older people wish to remain healthy and independent in their own homes for as long as possible. There are several advantages in using telehealth. Individuals do not have to travel to public health services to get information, sav-

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ing travel time and appointment delay. In addition, telehealth can give immediate access to extensive information resources. The information is always available, and can be retrieved as often as needed.^{3,4} For the health providers it reduces costs of, for instance, printing and distribution of brochures. With these advantages, it might be a suitable approach to supply general and health information to the large group of older people in the general population.

A common health problem in the general older population is forgetfulness. The percentage of individuals with subjective memory complaints was more than 50% in a population aged 65 years and older.⁵ Although complaints of forgetfulness are not necessarily associated with an actual decline in objective memory functioning,^{6,7} much hindrance and worries may be experienced as a result of this forgetfulness in daily life. In a study by Commissaris et al.,⁸ approximately 60% of all forgetful individuals perceived much hindrance and feel hampered by their forgetfulness in daily life, and approximately 70% of these individuals were very worried about their forgetfulness. Furthermore, several studies found that subjective memory complaints were related to a lower quality of life.^{9–12} So, forgetfulness seems to be an issue for many individuals. For that reason, it is important to inform the general population about forgetfulness and aging by easily accessible, always available, low-cost information services.

There is a limited amount of earlier studies on the use of telehealth, showing that telehealth could be useful to inform individuals about dementia. Mundt et al.¹³ investigated the need for an interactive voice response telephone system providing information about dementia. During 1 month, 193 people called, with an average call length of 9 minutes. Most people rated the information as very helpful.

In a study by Mahoney et al.,¹⁴ the effect of an automated telecommunication system designed for caregivers of patients with Alzheimer's Disease was investigated. Results of the 100 caregivers showed positive effects for a specific group; women who exhibited low mastery and high anxiety benefited most from the intervention.

A proportion of people with forgetfulness is interested to receive an intervention (e.g., memory training or other educational activities) to decrease their worries and increase memory functioning.⁸ The advantages of telehealth make it possible to reach large groups of older individuals with subjective memory complaints. However, no previous research has been done to evaluate whether telehealth is suitable to inform the older population about forgetfulness. It is therefore important to describe characteristics of individuals who use telehealth interventions that are aimed at older individuals. In addition, it is imperative to investigate what kind of information they request, and to evaluate their satisfaction with telehealth. In order to accomplish this, we designed two types of information services using telehealth and performed a systematic evaluation in this study. One type of information service was developed to give information through the Internet: the Memory Website. Access to the Internet is growing rapidly also for the older population, and many individuals are able to use this information service.¹⁵ In addition, the Internet has become an increasingly important source of health information for many individuals.^{16,17} The second type of information service was by telephone: the Memory Phone. Many older persons use their telephones comfortably and effectively and do not have access to, or are not able to navigate, the Internet.^{13,18}

The Memory Website and the Memory Phone were constructed according to the same design and procedure and contained the same information. They provided information about five topics related to memory and aging. The Memory Phone and the Memory Website are newly developed information services and offer structured information about memory and aging, are easily accessible, available 24 hours per day, anonymous, and have low costs. Both information services were specifically aimed at populations over 50, who were nonprofessionally interested in information about memory and forgetfulness. The evaluation of the information services presented in this study might be a lead for future interventions.

This study had three aims. Since telehealth is accessible for individuals of all ages, the first

aim of the study was to describe the characteristics of all individuals who were interested in the Memory Phone and the Memory Website and compare differences between the two information services. The second aim was to investigate in older (above 50 years) nonprofessional individuals whether Memory Website users and Memory Phone users requested different topics when using the services. The last aim was to determine and compare experiences after visiting the Memory Phone and the Memory Website in nonprofessional older (above 50 years) individuals.

MATERIALS AND METHODS

Participants

The Memory Phone and the Memory Website were launched in The Netherlands in March 2006 by press messages in newspapers, journals, radio programs, and by brochures that were distributed to the 38 memory clinics in The Netherlands and to other public health services. At all times the Memory Phone and the Memory Website were presented as equivalents of each other. Participants were individuals who called the Memory Phone and/or visited the Memory Website. The participants were informed that the Memory Phone and Memory Website would be scientifically evaluated. Access to the Memory Website was free

of costs and the Memory Phone was 1 Euro-cent per minute. The Ethical Committee Psychology (Faculty of Psychology, Maastricht University) approved the study.

Procedure

We composed the Memory Phone and the Memory Website with information obtained from scientific and medical literature.^{19,20} Figure 1 illustrates the framework of the structure of the two information services. Both information services had the same menu structure, and they presented identical information. The Memory Phone was an automated telephone system, where individuals could listen to spoken information. The Memory Website was an Internet site on the World Wide Web, where the information could be read.

As an introduction to the Memory Phone and the Memory Website, the participants received brief instructions about how to use the information services, and about the scientific evaluation that was coupled to the services. Participants who indicated that they would like to receive more information, could obtain instructions and/or information about the research. Subsequently, all individuals were asked to answer several questions (e.g., sex, age, the reason for visiting), which were of importance for the scientific evaluation of the facility. The questions are described in detail below.

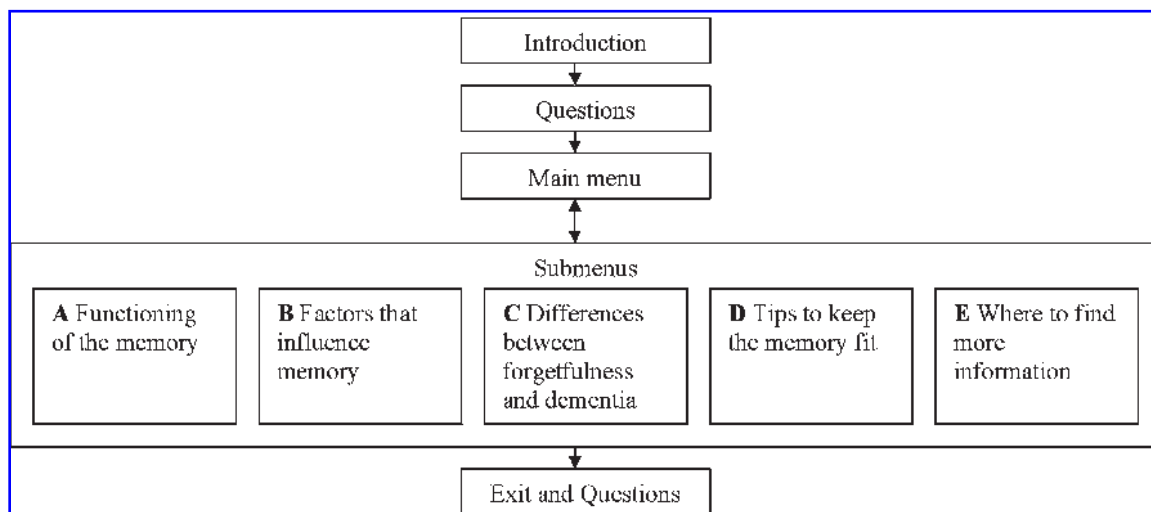


FIG. 1. Overview of the structure of the Memory Phone and the Memory Website.

After answering the questions, participants entered the main menu. From the main menu individuals could choose one of the five submenus with information. The first was "functioning of the memory," where information was given about the different kinds of memory, such as long-term and short-term memory, and conditions for a good functioning of the memory. The second submenu was "factors that influence memory," where information could be obtained about physical, psychological, and social factors and about how self-confidence can influence memory functioning. In the third submenu, "differences between normal forgetfulness and dementia," information was provided about normal forgetfulness that is caused by aging and the differences with dementia. In this submenu it is also stated that a general practitioner should be consulted when individuals think that dementia is causing the forgetfulness. The fourth submenu was "tips to keep the memory fit," where tips and strategies are given to improve the use of one's memory. The last submenu was "where to find more information," providing addresses, phone numbers, and Websites of institutes where more information could be obtained about forgetfulness and dementia. These topics were thought to give adequate background information about forgetfulness and aging, and provide strategies to cope with forgetfulness and give leads for further information. At any time, participants could return to the main menu and subsequently visit another submenu.

Participants were asked to leave the Memory Phone and Memory Website via the exit procedure. The option to go to the exit procedure was available in every menu. In the exit procedure, participants were asked several final questions (e.g., about the usefulness of the information) which are described below. Participants could also leave a message with any information such as missed information or other suggestions. Responding to questions in the exit procedure was not obligatory.

Due to the expected burden for the participants, and consequently probable drop-out, we restricted the number of the questions before entering the main menu. Several questions, such as level of education, were therefore asked during the exit procedure. Furthermore, to

avoid convenient answers on the questions, the answer options ranging from positive to negative were in a different order for each question.

Measures

Six characteristics were asked of participants before entering the main menu: sex, age, the main reason for calling (the answer options are stated in Table 1), and whether individuals perceived themselves forgetful (answer options: yes/no). Only those participants who indicated to be forgetful were additionally asked whether they perceived hindrance from their forgetfulness in daily life (answer options: yes/no). The last question was "Is this the first time you used the Memory Phone/Memory Website?" (answer options: yes/no).

In the exit procedure, participants were asked to answer four more questions: "How useful did you find the Memory Phone/Memory Website?," "Did your worries about your forgetfulness decrease after listening/reading the information?," "Are you planning to search for additional information after using the Memory Phone/Memory Website?" Answers to the questions in the exit procedure are stated in Table 2. The highest education was also asked. This was scored on a eight-point scale, ranging from (1) primary education to (8) university education.²¹

The variables sex, age, reason for visit, forgetfulness (and hindrance), first time visiting and education were used as independent variables to describe the study population. The variables usefulness, decrease in worries, and where to find more information were used as independent variables to describe the outcome features of the two information services.

The computer system logged the responses to the questions. Participants of the Memory Website typed all their answers on the computer. Participants of the Memory Phone could give all but one of their answers with a button press on their phone; only the question about highest education was voice recorded. Participants left their answer on the machine. The computer system recorded this answer and we manually scored the answers to the eight-point education scale. The computer system also logged the time and date of each visit to a ques-

TABLE 1. CHARACTERISTICS OF INDIVIDUALS VISITING THE MEMORY PHONE AND THE MEMORY WEBSITE

	<i>All participants (n = 2,859)</i>				<i>Nonprofessional participants >50 years (n = 1,850)</i>			
	<i>Memory Phone</i>	<i>n</i>	<i>Memory Website</i>	<i>n</i>	<i>Memory Phone</i>	<i>n</i>	<i>Memory Website</i>	<i>n</i>
Age (range 18–97 years) ^{a,b}	66 (± 11.6)	228	56 (± 15.2)	2,579	69 (± 9.2)	189	64 (± 8.9)	1,661
Education (8-point scale) ^a	4.6 (± 2.0)	45	5.0 (± 2.1)	1,194	4.8 (± 1.9)	39	4.5 (± 1.9)	806
Sex (% female) ^{a,b}	72%	216	55%	2,631	71%	184	54%	1,661
Forgetfulness (% yes)	78%	221	61%	2,608	83%	188	71%	1,650
Hinder of forgetfulness (% yes)	77%	167	76%	1,579	77%	146	74%	1,169
Reason for visit: ^{a,b}		221		2,617		189		1,661
Worried about perceived forgetfulness	57%		39%		62%		49%	
Worried about someone else's forgetfulness	17%		7%		18%		7%	
Generally interested in topic	17%		37%		20%		44%	
Professional	9%		17%		—		—	
First visit (% yes) ^c	100%	224	97%	2,593	98%	189	96%	1,631
Total time called (minutes:seconds; range 2:15 to 56:23)	13:18 ($\pm 8:38$)	228	—		13:24	189	—	
Mean number of sub menus visited per individual	1.68 (± 1.1)	228	1.57 (± 1.0)	2,631	1.53 (± 0.9)	189	1.67 (± 1.0)	1,661

^aSignificantly different between Memory Phone and Memory Website at $p < 0.01$ in all participants.^bSignificantly different between Memory Phone and Memory Website at $p < 0.01$ in nonprofessional participants >50 years.^cSignificantly different between Memory Phone and Memory Website at $p < 0.05$ in nonprofessional participants >50 years.

—, no data.

TABLE 2. OUTCOME INFORMATION OF NONPROFESSIONAL INDIVIDUALS ABOVE 50 YEARS, VISITING THE MEMORY PHONE AND THE MEMORY WEBSITE

	Memory Phone	n	Memory Website	n
How useful did you find the Memory Phone/Memory Website?		58		821
Very useful	45%		49%	
Little useful	50%		47%	
Not useful	5%		4%	
Did your worries about your forgetfulness decrease after listening/reading the information? ^a		62		815
Yes	63%		36%	
No	13%		18%	
No worries	17%		30%	
Don't know	7%		16%	
Are you planning to search for additional information after using the Memory Phone/Memory Website? ^a		60		810
Yes, professional help	7%		3%	
Yes, brochures and information on Internet	27%		24%	
Yes, visit Memory Phone/Memory Website	12%		1%	
No	48%		47%	
Don't know	6%		25%	

^aSignificantly different between Memory Phone and Memory Website at $p < 0.01$.

tion or to a submenu for every individual using the Memory Phone and the Memory Website. This made it possible to determine the time spent on each of the information services as well as which submenus with information the participants visited. Whether or not a participant visited a certain submenu was used as a dependent measure, when analyzing the differences in requested information between participants from the Memory Website and Memory Phone.

Statistical analyses

To determine differences in age between participants from the Memory Phone and the Memory Website, unpaired *t*-tests were performed. To analyze differences between Memory Phone and Memory Website in nominal variables, such as sex, perceived forgetfulness, and reason for visiting the information service, Chi-square tests were used. Mann-Whitney tests were performed to determine group differences in the level of education.

Furthermore, logistic regression analysis was used to test whether there were differences in the requested information between participants from the Memory Phone and the Memory Website. Visiting a certain submenu was used as the dependent variable; being a participant of the Memory Phone or the Memory

Website was the independent variable. Analyses were adjusted for two variables, namely age and sex, because users of the Memory Phone and the Memory Website differed on these two demographic variables. Five multiple logistic regression analyses are performed to analyze the five submenus. To correct for possible type I errors, a Bonferroni correction was applied resulting in an alpha level of $p < 0.01$. For all other analyses the alpha level for significance testing was set at $p < 0.05$.

RESULTS

Findings in all participants

Characteristics. In the first 3 months that the information services were accessible (March 2006 to June 2006), the Memory Website was visited by 3,872 individuals and the Memory Phone by 371 individuals. Of these, 1,241 Website users (32%) and 143 Phone users (39%) did not enter the main menu with the information and left, leaving 2,631 Website participants and 228 Phone participants that were used for analysis. Of 194 of the 1,384 individuals who dropped out before entering the main menu, data regarding age, sex, perceived forgetfulness, and reason for visiting were available. The only significant difference between drop-

outs and participants was sex; less female participants dropped out (49% vs. 57%; $\chi^2 (1, n = 3,041) = 4.4, p < 0.05$).

The characteristics of all participants who entered the main menu with information are shown in Table 1. Due to an error in the log system, some values of participants of information services were missing (max. 5%). Therefore, the number of participants is given with each variable. Some important differences were found between Memory Phone and Memory Website users. Individuals who used the Memory Phone were significantly older, $t(300) = 12.17, p < 0.01$, more often women, $\chi^2 (1, n = 2,847) = 21.71, p < 0.01$, and they perceived themselves more often as forgetful, $\chi^2 (1, n = 2,829) = 33.59, p < .01$. Also, the reason for using the Memory Phone was mainly someone's forgetfulness, while many users of the Memory Website also visited because of general interest in the topic, $\chi^2 (3, n = 2,838) = 78.08, p < 0.01$.

Findings in nonprofessional participants above 50 years

Participants' characteristics. Eighty-three percent of the individuals who used the Memory Phone and 64% of the Memory Website users consisted of nonprofessional individuals, aged above 50 years. In this population, we also determined differences between Memory Website and Memory Phone users. Characteristics of these individuals are also shown in Table 1. Individuals who used the Memory Phone were significantly older, $t(1,848) = 6.51, p < 0.01$, more often woman, $\chi^2 (1, n = 1,845) = 25.14, p < 0.01$, and perceived themselves more often as forgetful, $\chi^2 (1, n = 1,838) = 211.38, p < 0.01$. The reason for using the Memory Phone and the Memory Website was also different, $\chi^2 (2, n = 1,850) = 57.49, p < 0.01$. More participants of the Memory Phone called because of their worries about their own or someone else's forgetfulness, compared with Memory Website users. Memory Website users visited more often because of their general interest than Memory Phone users.

Requested information. In the nonprofessional participants aged above 50 years, users of the

Memory Website visited an equal number of submenus compared with users of the Memory Phone (see Fig. 2, where raw data are presented). After performing logistic regression (corrected for sex and age), it appeared that two submenus were significantly more visited by participants of the Memory Phone compared with participants of the Memory Website (i.e., "functioning of the memory" (odds ratio [OR] = 0.3; $W = 29.34, p < 0.01$) and "factors that influence the memory" (OR = 0.5; $W = 9.19, p < 0.01$). On the other hand, Memory Website users visited the submenu "tips to keep the memory fit" more (OR = 3.4; $W = 43.33, p < 0.01$) than Memory Phone Users. The submenus "Differences between forgetfulness and dementia" and "Where to find more information" were equally visited by participants of the Memory Website and by participants of the Memory Phone. No information is available of the time spent in the submenus.

Outcome information. In the specific group of nonprofessional participants above 50 years, 32% of the Memory Phone users and 49% of the Memory Website users visited the exit-procedure. Individuals who did not enter the exit procedure were significantly older, mean = 65 vs. mean = 64; $t(1,848) = 2.28, p < 0.05$, perceived themselves more often as forgetful (74% vs. 70%), $\chi^2 (1, n = 1,838) = 4.0, p < 0.05$ and visited more often because of worries about forgetfulness, $\chi^2 (2, n = 1,850) = 9.0, p < 0.05$.

In the nonprofessional participants above 50 years, results showed that a large part of the users of the Memory Phone and of the Memory Website considered the service to be very useful or a little useful (no significant difference between Website and Phone users; see Table 2).

When asked if the worries about someone's own or someone else's forgetfulness had decreased, 63% of the participants of the Memory Phone indicated that their worries had decreased, compared with 36% of the users of the Memory Website, $\chi^2 (3, n = 877) = 18.16, p < 0.01$. The percentage of individuals who indicated that they perceived no worries or did not know whether their memory complaints had reduced yet was higher in the Website users than in the Phone users. Additional analyses

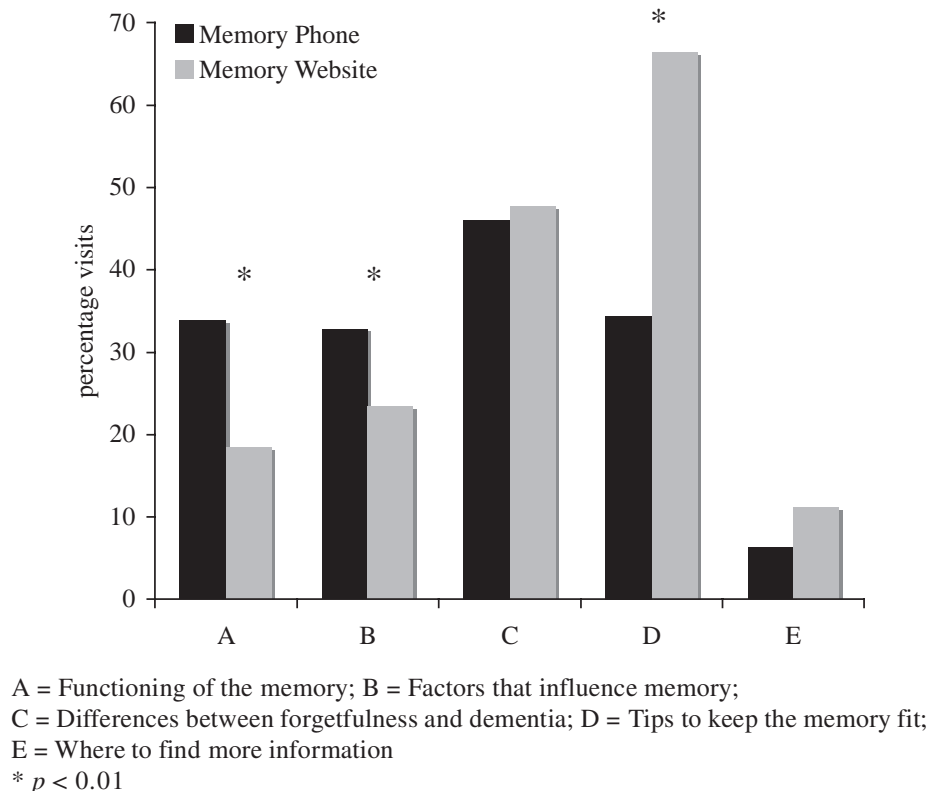


FIG. 2. Percentage visits of nonprofessional Memory Phone ($n = 189$) and Memory Website ($n = 1661$) users above 50 years.

with logistic regression showed that the difference between decrease in worries (yes/no) was still significantly different between Memory Phone and Memory Website users, after correcting for sex and age ($OR = 0.35$; $W = 5.27$, $p < 0.05$).

When participants were asked whether they were planning to search for more information, significant differences between users of the Memory Website and users of the Memory Phone were also found, $\chi^2(4, n = 870) = 48.45$, $p < 0.01$.

DISCUSSION

The present study aimed to evaluate and compare two newly developed information services about forgetfulness and aging, the Memory Phone and the Memory Website. A large group of individuals used the information services. The Memory Website was used by far more individuals than the Memory

Phone. Yet, it is interesting to note that the two services were used by different populations. Individuals who used the Memory Phone were significantly older, more often female, and perceived themselves more often as forgetful. On the other hand, more users of the Memory Website visited because of general interest in the topic of memory and aging compared with Memory Phone users. Specific differences were also found in the requested information between Memory Phone users and Memory Website users. Our focus was on the population consisting of nonprofessional participants above 50 years. In this group of participants, general information about memory was more often requested by Memory Phone users compared with Memory Website users (67% vs. 41%, respectively). Memory Website users, on the other hand, requested strategies and tips more often than Memory Phone users (66% vs. 34%, respectively). After obtaining the information, the Memory Phone and the Memory Website were considered equally useful.

In the present study, more individuals used the Memory Website than the Memory Phone ($n = 2631$ vs. $n = 228$). Several previous studies have also found that the telephone as information service is used less frequently than a website facility. In a study by Lerner,²² the use of Internet Websites and a telephone helpline as sources of medical information were investigated in patients and their caregivers attending a specialized health care facility for cognitive dysfunction. Of the 104 patients and carers evaluated in that study, 28 patients/carers searched for medical Websites, and only 10 had used the telephone service. Basch et al.²³ investigated in a survey among 223 cancer patients and 220 companions that telephone resources were used substantially less often as information resources about cancer than the Internet. So, telephone resources were not commonly accessed. We can only speculate about possible reason for the finding that the telephone is not used as often as the Internet. Possibly, calling a telephone service requires more effort and is experienced as less easy than visiting a website. However, with the advent of new mobile technologies such as wireless Web browsing, short messaging systems, or interactive telephone programs, there may be an opportunity for increased use of telephone based healthcare application in the future.²³ Furthermore, even though the telephone is not used as often as the Internet, it is still an information service that can be used by the older population. This is also found in the current study, in which the average age of users of the Memory Phone was higher than that of the Memory Website. Only a few older people own a computer or have access to it,^{18,24} and many older persons use their telephones comfortably and effectively.^{13,18} Therefore, it is underscored that different types of information services should be used to offer information about memory and aging to reach a broad range of people.

In nonprofessionals above 50 years it appeared that participants of the Memory Phone were more interested in general information about the memory than Website users, who were more interested in tips and strategies to cope with forgetfulness. Previous studies have also found specific differences in requested in-

formation between information services. However, these studies give contradictory results, with regard to the information requested for the Internet and for the telephone. Basch et al. investigated the information resources by patients with cancer and their companions.²³ Comparable to our study, it was found that most Internet users sought information on treatment and coping. Another study, by Hardyman et al.,²⁵ found opposite results, when investigating two comparable sources of cancer information, a website and a telephone helpline. Results showed that Internet users search for facts to fulfill their basic information needs, while users of the telephone helpline wish to discuss issues such as treatments and coping with the disease. Finally, Mundt et al.¹³ investigated an interactive voice response (IVR) dementia information system. Of the 178 callers reaching the main menu, most individuals requested general information about dementia and information about treatment, while a minority requested information about the prevalence and risk factors and the information about where to find more information. So, populations interested in other topics use different information services to obtain the information they need. In the present study, both information services were used to request specific information. This underscores the need for both services, so everybody can obtain the information needed.

After using the information services we hope to enable individuals to evaluate their cognitive functioning and subsequently decrease the worries about developing dementia, or encourage them to visit the general practitioner when memory complaints have a more serious character. In the target group, worries were reduced more often after using the Memory Phone than after using the Memory Website. A possible explanation for this might be that different information is obtained while using the two services. Apparently, after obtaining general information regarding the memory, worries will decrease more than when tips are obtained. Another possible explanation could be that the phone, as a medium, decreases more worries than the Internet. Although the analyses to determine the differences between Memory Phone and Memory Website were cor-

rected for age and sex, it is also possible that other participant's characteristics (e.g., the amount of experienced fear of dementia, level of education) are causing the difference in decrease in worries. Note, however, that the results have to be interpreted with caution, because the decrease in worries was asked with a single question, without specifying the amount of worries experienced beforehand and afterward. More research is needed to elaborate on these results and explanations.

Other than traditional care and health prevention, the users of telehealth are nonprofessionals as well as professionals. The nonprofessionals are consumers, such as "worried well" and health-conscious individuals, and the professionals are health providers, such as the traditional physicians, nurses, and other health professionals.²⁶ These professionals are interested to learn and want to be informed about the latest information available.²⁷ The professionals in the present study had a distinct preference for the Memory Website over the Memory Phone (17 vs. 9%, respectively).

A strong point of the present study is the large number of participants who used the information services. Also, older individuals who were not professionally interested were reached by the mediums; 83% of the Phone users and 64% of the Website users belonged to this population. Besides these strong aspects, the results of this study have to be interpreted with caution. Differences found between Memory Website and Memory Phone users might not only be caused by the intervention, other factors, such as level of education, previous obtained knowledge about forgetfulness, experienced memory-related anxiety, access to and experiences with computer use and the fact that the use of the Memory Website was free but the use of the Memory Phone was 1 cent per minute might also have influenced the differences found between Memory Phone and Memory Website users. In the present study, we took possible influences of sex and age on the findings into account, by correcting the analyses for these two variables. In the future, more characteristics of individuals can be obtained, to correct for possible other factors influencing the differences between the two types of telehealth.

In conclusion, different populations used the Memory Phone and the Memory Website. Individuals who used the Memory Phone were significantly older, more often female, and perceived themselves more often as forgetful. On the other hand, users of the Memory Website visited more often because of general interest in the topic of memory and aging than Memory Phone users. In the specific group of nonprofessionals above 50 years, general information about the memory was more requested by phone users compared with Website users. Memory Website users requested more often strategies and tips than Memory Phone users. Furthermore, the Memory Phone and the Memory Website were both considered useful. Overall, the Memory Website and the Memory Phone are two different types of evidence-based telehealth interventions, reaching different populations, and are considered useful by older individuals.

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